

Recent Electronic Structure Studies on Various Carbon Nanotube Systems

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The focus of the talk is related to electronic structure studies of nanotube systems using electron energy-loss, optical, and photoemission spectroscopy. There we report on undoped, aligned, n- and p-type doped, and fullerene-filled nanotubes. In particular, we present high-resolution photoemission results on K-intercalated carbon nanotubes, where we observe a transition from a Luttinger liquid behavior at low dopant concentration to a Fermi liquid behavior at higher dopant levels. More recently, we have performed similar measurements on C₆₀ filled nanotubes. At intermediate doping level, the partially filled LUMO in the one-dimensional C₆₀ chain forms an additional conduction channel indicated by a reduction of the power law scaling factor. At the highest doping level, when also the conduction band of the semiconducting tubes is filled, a normal Fermi liquid behavior is observed.